

ECONOMIC IMPACT OF BANNING METHYL BROMIDE USE IN CALIFORNIA AGRICULTURE

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Public and worker health concerns are motivating the cancellation of many agricultural chemicals. One chemical currently under regulatory scrutiny is methyl bromide (MBr), a commonly used soil and commodity fumigant. The growing interest in analyzing the economic impact of removing MBr in agriculture is reflected in recent papers (e.g., Deepak et al., 1997; Lynch, 1996; and Sunding et al., 1993 and 1996). This study continues research along this line by measuring the economic cost of prohibiting MBr use in California agriculture. The report does not quantify the public health benefits of banning MBr, and thus is only one side of a full cost-benefit analysis.

We use a "microparameter" approach to measuring the economic consequences of restricted MBr use. This method involves direct measurement of the change in producer and consumer welfare resulting from cancellation based on information concerning the changes in per acre production costs and per-acre yields from adopting alternative pest control technologies. This method is applied separately to each growing region, reflecting significant regional diversity in California growing conditions.

The analysis relies extensively on detailed information concerning MBr and its alternatives for the major growing regions in which MBr is currently used. As such, this research also provides a framework for interdisciplinary cooperation in assessing the impacts of pesticide regulations.

Our current analysis differs from those of previous years (Sunding et al. 1993 and 1996) in several important respects. First, 1,3-dichloropropene (Telone) has been re-registered in California, and must therefore be considered as an alternative. Information received from researchers and farm advisors suggests that it will be the primary replacement for MBr as a soil fumigant and will somewhat mitigate the impacts of MBr removal relative to previous analyses. Second, the current analysis uses updated, three-year average (1993-95) farm price and output data, and 1994 MBr use data. Third, the current analysis distinguishes between producer and consumer loss or gain, thereby providing a more general analysis of the impacts of banning MBr.

We estimate the short-term impact of removing methyl bromide completely. Table 1 below summarizes the range of impacts of this ban. These ranges represent what the authors consider a "reasonable" range given the variety of comments made by scientists interviewed for our analysis. The values account for changes in per-acre production costs and yields.

Cost changes as well as yield losses are accounted for among crops impacted by removing MBr as a soil fumigant. The impact on strawberries assumes a 3 to 8 percent yield loss. Yield losses in trees and vines range from 3 to 4 percent after they begin to bear fruit or nuts. Nursery losses range from 10 to 40 percent. Variances in exports were assumed to be within 20 percent of the 1993-95 averages. While prices and quantity exported can vary by more than 20 percent from year-to-year, total revenues will vary by less since prices and quantity tend to vary inversely.

These ranges suggest that the yearly impact on grower profits of removing MBr can vary from as low as \$71 million to as high as \$154 million. In years of exotic pest infestations, the loss in profits can range from \$191 million to \$334 million. The net impact (accounting for consumer benefits or loss as well as grower loss) of a MBr ban varies similarly. Yearly impacts range from almost \$60 million to \$139 million. In years of pest infestations, net impact can range from \$128 million to \$242 million.

The average estimated impacts in this report are lower than those found in analyses in previous analyses since 1,3-dichloropropene was not available as an alternative in previous years. The availability of this chemical affects the impact of removing MBr as a soil fumigant. By contrast, there has been little progress in identifying viable alternatives to MBr use for post-harvest fumigation. In fact, potential export losses have grown due to exports becoming an increasingly important avenue of sales for Californian growers. Even though post-harvest fumigation represents a small portion of total MBr used, it plays an important role in the export market, especially if there is an infestation. Moreover, it protects the agricultural sector from exotic pests.

There is a great deal of uncertainty associated with the calculation of impacts reported in our study. As discussed in the body of our report, limited experimental opportunities, and unpredictable potential for innovation constrain our ability to forecast future outcomes. Furthermore, we are investigating only the economic costs to farmers and consumers of banning MBr. A more complete picture of the impact of banning MBr would require also analyzing the environmental and health benefits associated with this action. Though our analysis does not address those benefits directly, it does suggest that 1,3-dichloropropene and chloropicrin would be the primary substitutes for MBr following a ban. These substitutes are chemicals that themselves have negative environmental and health impacts. Therefore the benefits associated with removing MBr from use will at least partially be offset by the increased use of other harmful chemicals.

Much of the current MBr-related research is focused on developing profitable alternatives. This focus is appropriate given the quickly approaching deadline for the MBr phase out. However, long term research must continue to address the goal of reducing public health risks. This research could examine three questions: how to achieve similar production results using smaller quantities of pesticides, what application methods can reduce public exposure to the harmful effects of chemicals, and the development of viable non-chemical alternatives.

Table 1: Summary and Range of Impacts of Banning Methyl Bromide

| Commodity | Grower Impact | | | Net Impact | | |
|-------------------------|-------------------------|--------------------------|-----------------------------|-------------------------|--------------------------|-----------------------------|
| | Low Estimate \$1,000 | High Estimate \$1,000 | Average Estimate \$1,000 | Low Estimate \$1,000 | High Estimate \$1,000 | Average Estimate \$1,000 |
| Strawberries | -8,694 | -24,342 | -16,518 | -10,179 | -28,414 | -19,296 |
| Trees and Vines | -21,506 | -34,964 | -28,235 | -21,506 | -34,964 | -28,235 |
| Nurseries | -13,326 | -53,305 | -33,316 | -13,326 | -53,305 | -33,316 |
| Soil Fumigation | -43,527 | -112,611 | -78,069 | -45,011 | -116,683 | -80,847 |
| Regular Exports | -27,917 | -41,875 | -34,896 | -14,864 | -22,296 | -18,580 |
| Yearly Impacts | -71,443 | -154,486 | -112,965 | -59,875 | -138,979 | -99,427 |
| Potential Exports | -119,665 | -179,497 | -149,581 | -68,437 | -102,655 | -85,546 |
| Potential Impact | -191,108 | -333,983 | -262,546 | -128,312 | -241,635 | -184,973 |

Source: Calculated